WHAT IS CLAIMED IS:

1. A composition comprising:

(a) about 1 ng to about 30 mg of a polynucleotide in aqueous solution which operably encodes a polypeptide upon delivery to vertebrate cells *in vivo*;

(b) a salt selected from the group consisting of sodium acetate, sodium bicarbonate, sodium sulfate, potassium phosphate, potassium acetate, potassium bicarbonate, potassium sulfate, sodium glycero-phosphate, sodium glucose-6-phosphate, and reaction, association, or dissociation products thereof;

wherein said salt is dissolved in said aqueous solution at a molar concentration ranging from about 20 mM to about 300 mM.

2. The composition of claim 1, wherein said salt is sodium acetate or reaction, association, or dissociation products thereof.

3. The composition of claim 1, wherein said salt is sodium bicarbonate or reaction, association, or dissociation products thereof.

4. The composition of claim 1, wherein said salt is sodium sulfate or reaction, association, or dissociation products thereof.

5. The composition of claim 1, wherein said salt is sodium acetate or reaction, association, or dissociation products thereof.

6. The composition of claim 1, wherein said salt is potassium phosphate or reaction, association, or dissociation products thereof.

7. The composition of claim 1, wherein said salt is potassium acetate or reaction, association, or dissociation products thereof.

8. The composition of claim 1, wherein said salt is potassium bicarbonate or reaction, association, or dissociation products thereof.

9. The composition of claim 1, wherein said salt is potassium sulfate or reaction, association, or dissociation products thereof.

10. The composition of claim 1, wherein said salt is sodium glycero-phosphate or reaction, association, or dissociation products thereof.

11. The composition of claim 1, wherein said salt is sodium glucose-6-phosphate or reaction, association, or dissociation products thereof.

12. The composition of claim 1, wherein said salt is present at a molar concentration of about 100 mM to about 200 mM.

13. The composition of claim 1, wherein said salt is present at a molar concentration of about 150 mM.

14. The composition of claim 12, further comprising chloride ion in said aqueous solution at a molar equivalent concentration of zero (0) mM to about 125 mM, and reaction, association, or dissociation products thereof.

15. The composition of claim 14, comprising chloride ion at a molar equivalent concentration from 0 mM to about 10 mM.

16. The composition of claim 15, which is substantially free of chloride ion.

17. The composition of claim 1, wherein said polynucleotide is DNA operably associated with a promoter.

18. The composition of claim 17, wherein said polynucleotide is contained in a plasmid.

19. The composition of claim 1, wherein said polynucleotide is RNA.

20. The composition of claim 19, wherein said polynucleotide is contained in messenger RNA.

21. The composition of claim 1, wherein said polypeptide is selected from the group consisting of a therapeutic polypeptide, an antigenic polypeptide, an immunogenic polypeptide, an immunomodulatory polypeptide, and a functional self polypeptide.

22. The composition of 21, wherein said therapeutic polypeptide is selected from the group consisting of granulocyte macrophage colony stimulating factor, granulocyte colony stimulating factor, macrophage colony stimulating factor colony stimulating factor, interleukin 2, interleukin-3, interleukin 4, interleukin 5, interleukin 6, interleukin 7, interleukin 8, interleukin 10, interleukin 12, interleukin 15, interleukin 18, interferon alpha, interferon beta, interferon gamma, interferon omega, interferon tau, interferon gamma inducing factor I, transforming growth factor beta, RANTES, macrophage inflammatory proteins, *Leishmania* elongation initiating factor, platelet derived growth factor, tumor necrosis factor, epidermal growth factor, vascular epithelial growth factor, fibroblast growth factor, nerve growth factor, brain derived neurotrophic factor, neurotrophin-2, neurotrophin-3, neurotrophin-4, neurotrophin-5, glial cell line-derived neurotrophic factor, ciliary neurotrophic factor, erythropoietin, insulin, and therapeutically active fragments, analogs, or derivatives thereof.

23. The composition of claim 21, wherein said antigenic polypeptide is selected from the group consisting of a bacterial polypeptide, a viral polypeptide, a fungal polypeptide, a parasite polypeptide, an allergenic polypeptide, a tumor specific polypeptide, and antigenic fragments, derivatives, or analogs thereof.

24. The composition of claim 21, wherein said immunogenic polypeptide is selected from the group consisting of a bacterial polypeptide, a viral polypeptide, a fungal polypeptide, a parasite polypeptide, an allergenic polypeptide, a tumor specific polypeptide, and immunogenic fragments, derivatives, or analogs thereof.

25. The composition of claim 21, wherein said immunomodulatory polypeptide is selected from the group consisting of a cytokine, a chemokine, and fragments, derivatives, or analogs thereof having immunomodulatory activity.

26. The composition of claim 21, wherein said functional self polypeptide is selected from the group consisting of insulin, dystrophin, cystic fibrosis transmembrane conductance regulator, granulocyte macrophage colony stimulating factor, granulocyte colony stimulating factor, macrophage colony stimulating factor colony stimulating factor, interleukin 2, interleukin-3, interleukin 4, interleukin 5, interleukin 6, interleukin 7, interleukin 8, interleukin 10, interleukin 12, interleukin 15, interleukin 18, interferon alpha, interferon beta, interferon gamma, interferon omega, interferon tau, interferon gamma inducing factor I, transforming growth factor beta, RANTES, macrophage inflammatory proteins, platelet derived growth factor, tumor necrosis factor, epidermal growth factor, vascular epithelial growth factor, fibroblast growth factor, nerve growth factor, brain derived neurotrophic factor, neurotrophin-2, neurotrophin-3, neurotrophin-4, neurotrophin-5, glial cell line-derived neurotrophic factor, ciliary neurotrophic factor,

erythropoietin, and therapeutically active fragments, analogs, or derivatives thereof.

27. The composition of claim 1, further comprising a transfection facilitating agent selected from the group consisting of calcium phosphate, gold, tungsten, or other metal particles, peptides, proteins, and polymers.

28. The composition of claim 1, further comprising an auxiliary agent selected from the group consisting of a surfactant, a detergent, a polysaccharide, a chelator, a DNase inhibitor, and a condensing agent.

29. The composition of claim 28, wherein said auxiliary agent selected from the group consisting of Pluronic® F68, Pluronic® F77, Pluronic® F108, Pluronic® F127, Pluronic® P65, Pluronic® P85, Pluronic® F103, Pluronic® P104, Pluronic® P105, Pluronic® P123, Pluronic® L31, Pluronic® L43, Pluronic® L44, Pluronic® L61, Pluronic® L62, Pluronic® L64, Pluronic® L81, Pluronic® L92, Pluronic® L101, Pluronic® L121, Pluronic® R 17R4, Pluronic® R 25R4, Pluronic® R 25R2, IGEPAL CA 630®, NONIDET NP-40, Nonidet ® P40, Tween-20®, Tween-80®, Triton X-100™, Triton X-114™, Thesit®; sodium dodecyl sulfate (SDS); stachyose; dimethylsulfoxide (DMSO); and EDTA.

30. The composition of claim 29, wherein said auxiliary agent is selected from the group consisting of Nonidet® P40, Triton X-100™, Pluronic® F68, Pluronic® F77, Pluronic® F108, Pluronic® P65, Pluronic® F103, Pluronic® L31, Pluronic® L44, Pluronic® L61, Pluronic® L64, Pluronic® L92, Pluronic® R 17R4, Pluronic® R 25R4 and Pluronic® R 25R2.

31. The composition of claim 30, wherein said auxiliary agent is Pluronic® R 25R2.

32. The composition of claim 30, comprising an amount of auxiliary agent selected from the group consisting of about about 0.01% (v/v) to about 0.1% (v/v) of NONIDET NP-40®; about 0.006% (v/v) to about 0.1% (v/v) of Triton X-100™; about 0.1% (w/v) to about 6.0% (w/v) of Pluronic® F68; about 0.001% (w/v) to about 2.0% (w/v) of Pluronic® F77; about 0.01% (w/v) to about 1.0% (w/v) of Pluronic® F108; about 0.01% (w/v) to about 1% (w/v) Pluronic® P65; about 0.01% (w/v) to about 1.0% (w/v) of Pluronic® F103; about 0.0005% (w/v) to about 1.0% (w/v) of Pluronic® L44; about 0.01% (w/v) to about 1.0% (w/v) of Pluronic® L64; about 0.002% (w/v) to about 1.0% (w/v) of Pluronic® R 17R4; about 0.002% (w/v) to about 1.0% (w/v) of Pluronic® R 25R4; and about 0.001% (w/v) to about 1.0% (w/v) of Pluronic® R 25R2.

33. The composition of claim 32, comprising about 0.001% (w/v) to about 1.0% (w/v) of Pluronic® R 25R2.

34. The composition of claim 32, comprising an amount of auxiliary agent selected from the group consisting of about 0.01% (v/v) to about 0.05% (v/v) of NONIDET N-P 40®; about 0.01% (v/v) to about 0.03% (v/v) of Triton X-100™; about 0.5% to about 4.0% (w/v) of Pluronic® F68; about 0.1% (w/v) to about 1.7% (w/v) of Pluronic® F77; about 0.05% (w/v) to about 0.5% (w/v) of Pluronic® F108, about 0.1% (w/v) to about 1% (w/v) of Pluronic® P65; about 0.05% (w/v) to about 0.10% (w/v) of Pluronic® F103; about 0.001% (w/v) to about 0.1% (w/v) Pluronic® L31; about 0.001% (w/v) to about 0.10% (w/v) of Pluronic® L44; about 0.001% (w/v) to about 0.1% (w/v) Pluronic® L61; about 0.01% (w/v) to about 0.5% (w/v) of Pluronic® L64; about 0.001 % (w/v) to about 1.0% (w/v) Pluronic® L92; about 0.01%

(w/v) to about 0.10% (w/v) of Pluronic® R 17R4; about 0.01% (w/v) to about 0.10% (w/v) of Pluronic® R 25R4; and about 0.001% (w/v) to about 0.1% (w/v) of Pluronic® R 25R2.

35. The composition of claim 32, comprising about 0.001% (w/v) to about 0.1% (w/v) of Pluronic® R 25R2.

36. The composition of claim 32, comprising an amount of auxiliary agent selected from the group consisting of 0.01% NONIDET NP-40®; 0.01% (v/v) Triton X-100™; 4% Pluronic® F68; 1.0% (w/v) Pluronic® F77; 0.1% (w/v) of Pluronic® F108; 0.5% (w/v) of Pluronic® P65; 0.05% (w/v) of Pluronic® F103; 0.05% (w/v) of Pluronic® L31; 0.001% (w/v) of Pluronic® L44; 0.01% (w/v) of Pluronic® L61; about 0.01% (w/v) to about 0.1% (w/v) of Pluronic® L64; 0.05% (w/v) of Pluronic® L92; 0.10% (w/v) of Pluronic® R 17R4; 0.01% (w/v) of Pluronic® R 25R4; and 0.01% (w/v) of Pluronic® R 25R2.

37. The composition of claim 33, comprising 0.01% (w/v) of Pluronic® R 25R2.

38. A method for delivering a polypeptide to a vertebrate, comprising administering into a tissue or cavity of said vertebrate the composition of claim 1;

wherein said polypeptide is expressed in the vertebrate in an amount sufficient to be detectable.

39. The method of claim 38;

wherein said polypeptide is a therapeutic polypeptide;

wherein said vertebrate is in need of the therapy provided by said polypeptide; and

wherein said therapeutic polypeptide is expressed in the vertebrate in a therapeutically effective amount.

40. The method of claim 38,

wherein said polypeptide is an immunogenic or immunomodulatory polypeptide;

wherein said vertebrate is in need of such an enhanced or modulated immune response provided by said polypeptide; and

wherein said immunogenic or immunomodulatory polypeptide is expressed in the vertebrate in a sufficient amount to induce a desired immune response.

41. The method of claim 38,

wherein said polypeptide is a functional self polypeptide;

wherein said vertebrate is incapable of making a sufficient amount of said polypeptide; and

wherein said functional self polypeptide is expressed in the vertebrate in a sufficient amount to supply the vertebrate's requirements for said polypeptide.

42. The method of claim 38, wherein said vertebrate is a mammal.

43. The method of claim 42, wherein said mammal is a human.

44. The method of claim 38, wherein said tissue is selected from the group consisting of muscle, skin, brain tissue, lung tissue, liver tissue, spleen tissue, bone marrow tissue, thymus tissue, heart tissue, lymph tissue, blood tissue, bone tissue, connective tissue, mucosal tissue, pancreas tissue, kidney tissue, gall bladder tissue, intestinal tissue, testicular tissue, ovarian tissue, uterine tissue, vaginal tissue, rectal tissue, nervous system tissue, eye tissue, glandular tissue, and tongue tissue.

45. The method of claim 38, wherein said cavity is selected from the group consisting of the lungs, the mouth, the nasal cavity, the stomach, the peritoneal cavity, the intestine, a heart chamber, veins, arteries, capillaries, lymphatic cavities, the uterine cavity, the vaginal cavity, the rectal cavity, joint cavities, ventricles in brain, spinal canal in spinal cord, and the ocular cavities.

46. The method of claim 33, wherein said cavity comprises a mucosal surface.

47. The method of claim 45, wherein said tissue is muscle.

48. The method of claim 47, wherein said tissue is skeletal muscle, smooth muscle, or myocardium.

49. The method of claim 38, wherein said administration is intravenous.

50. The method of claim 38, wherein said administration is by a route selected from the group consisting of intramuscular, intratracheal, intranasal, transdermal, interdermal, subcutaneous, intraocular, vaginal, rectal, intraperitoneal, intraintestinal and inhalation.

51. The method of claim 38, wherein said administration route is intramuscular.

52. The method of claim 51, wherein said administration is by intramuscular injection.

53. A method of reducing the amount of polynucleotide required to obtain a desired clinical response in a vertebrate, comprising administering to the vertebrate the composition of claim 1.

54. A pharmaceutical kit comprising:

(a) a container holding about 1 ng to about 30 mg of a polynucleotide which operably encodes a polypeptide within vertebrate cells *in vivo*; and

(b) an amount of a salt selected from the group consisting of sodium acetate, sodium bicarbonate, sodium sulfate, potassium phosphate, potassium acetate, potassium bicarbonate, potassium sulfate, sodium glycero-phosphate, and sodium glucose-6-phosphate, wherein said salt, when dissolved in an prescribed volume of distilled water, results in an aqueous solution with a molar concentration of said salt from about 20 mM to about 300 mM, or reaction, association, or dissociation products thereof;

whereby said polynucleotide is provided in a prophylactically or therapeutically effective amount to treat a vertebrate.

55. The pharmaceutical kit of claim 54, wherein (b) is in the container of (a).

56. The pharmaceutical kit of claim 54, wherein (b) is in a separate container from (a).

57. The pharmaceutical kit of claim 54, further comprising an administration means.

58. A composition comprising:

(a) about 1 ng to about 30 mg of a polynucleotide which operably encodes a polypeptide upon delivery to vertebrate cells *in vivo*;

(b) an auxiliary agent selected from the group consisting of a surfactant, a detergent, a polysaccharide, a chelator, a DNase inhibitor, a condensing agent, combinations thereof, and reaction, association and dissociation products thereof; and

(c) water.

59. The composition of claim 58, wherein said auxiliary agent is selected from the group consisting of Pluronic® F68, Pluronic® F77, Pluronic® F108, Pluronic® F127, Pluronic® P65, Pluronic® P85, Pluronic® F103, Pluronic® P104, Pluronic® P105, Pluronic® P123, Pluronic® L31, Pluronic® L43, Pluronic® L44, Pluronic® L61, Pluronic® L62, Pluronic® L64, Pluronic® L81, Pluronic® L92, Pluronic® L101, Pluronic® L121, Pluronic® R 17R4, Pluronic® R 25R4, Pluronic® R 25R2, IGEPAL CA 630®, NONIDET NP-40, Nonidet ® P40, Tween-20®, Tween-80®, Triton X-100™, Triton X-114™, Thesit®; sodium dodecyl sulfate (SDS); stachyose; dimethylsulfoxide (DMSO); and EDTA.

60. The composition of claim 59, wherein said auxiliary agent is selected from the group consisting of Nonidet® P40, Triton X-100™, Pluronic® F68, Pluronic® F77, Pluronic® F108, Pluronic® P65, Pluronic® F103, Pluronic® L31, Pluronic® L44, Pluronic® L61, Pluronic® L64, Pluronic® L92, Pluronic® R 17R4, Pluronic® R 25R4 and Pluronic® R 25R2.

61. The composition of claim 60, wherein said auxiliary agent is Pluronic® R 25R2.

62. The composition of claim 60, comprising an amount of auxiliary agent selected from the group consisting of about about 0.01% (v/v) to about 0.1% (v/v) of NONIDET NP-40®; about 0.006% (v/v) to about 0.1%

(v/v) of Triton X-100™; about 0.1% (w/v) to about 6.0% (w/v) of Pluronic® F68; about 0.001% (w/v) to about 2.0% (w/v) of Pluronic® F77; about 0.01% (w/v) to about 1.0% (w/v) of Pluronic® F108; about 0.01% (w/v) to about 1% (w/v) Pluronic® P65; about 0.01% (w/v) to about 1.0% (w/v) of Pluronic® F103; about 0.0005% (w/v) to about 1.0% (w/v) of Pluronic® L44; about 0.01% (w/v) to about 1.0% (w/v) of Pluronic® L64; about 0.002% (w/v) to about 1.0% (w/v) of Pluronic® R 17R4; about 0.002% (w/v) to about 1.0% (w/v) of Pluronic® R 25R4; and about 0.001% (w/v) to about 1.0% (w/v) of Pluronic® R 25R2.

63. The composition of claim 62, comprising about 0.001% (w/v) to about 1.0% (w/v) of Pluronic® R 25R2.

64. The composition of claim 62, comprising an amount of auxiliary agent selected from the group consisting of about 0.01% (v/v) to about 0.05% (v/v) of NONIDET N-P 40®; about 0.01% (v/v) to about 0.03% (v/v) of Triton X-100™; about 0.5% to about 4.0% (w/v) of Pluronic® F68; about 0.1% (w/v) to about 1.7% (w/v) of Pluronic® F77; about 0.05% (w/v) to about 0.5% (w/v) of Pluronic® F108, about 0.1% (w/v) to about 1% (w/v) of Pluronic® P65; about 0.05% (w/v) to about 0.10% (w/v) of Pluronic® F103; about 0.001% (w/v) to about 0.1% (w/v) Pluronic® L31; about 0.001% (w/v) to about 0.10% (w/v) of Pluronic® L44; about 0.001% (w/v) to about 0.1% (w/v) Pluronic® L61; about 0.01% (w/v) to about 0.5% (w/v) of Pluronic® L64; about 0.001 % (w/v) to about 1.0% (w/v) Pluronic® L92; about 0.01% (w/v) to about 0.10% (w/v) of Pluronic® R 17R4; about 0.01% (w/v) to about 0.10% (w/v) of Pluronic® R 25R4; and about 0.001% (w/v) to about 0.1% (w/v) of Pluronic® R 25R2.

65. The composition of claim 64, comprising about 0.001% (w/v) to about 0.1% (w/v) of Pluronic® R 25R2.

66. The composition of claim 64, comprising an amount of auxiliary agent selected from the group consisting of 0.01% NONIDET NP-40®; 0.01% (v/v) Triton X-100™; 4% Pluronic® F68; 1.0% (w/v) Pluronic® F77; 0.1% (w/v) of Pluronic® F108; 0.5% (w/v) of Pluronic® P65; 0.05% (w/v) of Pluronic® F103; 0.05% (w/v) of Pluronic® L31; 0.001% (w/v) of Pluronic® L44; 0.01% (w/v) of Pluronic® L61; about 0.01% (w/v) to about 0.1% (w/v) of Pluronic® L64; 0.05% (w/v) of Pluronic® L92; 0.10% (w/v) of Pluronic® R 17R4; 0.01% (w/v) of Pluronic® R 25R4; and 0.01% (w/v) of Pluronic® R 25R2.

67. The composition of claim 66, comprising 0.01% (w/v) of Pluronic® R 25R2.

68. The composition of claim 58, further comprising a salt M-X wherein M is a cation selected from the group consisting of sodium and potassium, and wherein X is an anion selected from the group consisting of phosphate, acetate, bicarbonate, sulfate, and pyruvate.

69. The composition of claim 68, wherein said salt is sodium phosphate or potassium phosphate.

70. The composition of claim 58, wherein said polynucleotide is DNA operably associated with a promoter.

71. The composition of claim 70, wherein said polynucleotide is contained on a plasmid.

72. The composition of claim 58, wherein said polynucleotide is RNA.

73. The composition of claim 72, wherein said polynucleotide is contained in messenger RNA.

74. The composition of claim 58, wherein said polypeptide is selected from the group consisting of a therapeutic polypeptide, an antigenic polypeptide, an immunogenic polypeptide, an immunomodulatory polypeptide, and a functional self polypeptide.

75. The composition of claim 74, wherein said therapeutic polypeptide is selected from the group consisting of granulocyte macrophage colony stimulating factor, granulocyte colony stimulating factor, macrophage colony stimulating factor colony stimulating factor, interleukin 2, interleukin-3, interleukin 4, interleukin 5, interleukin 6, interleukin 7, interleukin 8, interleukin 10, interleukin 12, interleukin 15, interleukin 18, interferon alpha, interferon beta, interferon gamma, interferon omega, interferon tau, interferon gamma inducing factor I, transforming growth factor beta, RANTES, macrophage inflammatory proteins, *Leishmania* elongation initiating factor, platelet derived growth factor, tumor necrosis factor, epidermal growth factor, vascular epithelial growth factor, fibroblast growth factor, nerve growth factor, brain derived neurotrophic factor, neurotrophin-2, neurotrophin-3, neurotrophin-4, neurotrophin-5, glial cell line-derived neurotrophic factor, ciliary neurotrophic factor, erythropoietin, insulin, and therapeutically active fragments, analogs, or derivatives thereof.

76. The composition of claim 74, wherein said antigenic polypeptide is selected from the group consisting of a bacterial polypeptide, a viral polypeptide, a fungal polypeptide, a parasite polypeptide, an allergen, a

tumor specific polypeptide and antigenic fragments, analogs, or derivatives thereof.

77. The composition of claim 74, wherein said immunogenic polypeptide is selected from the group consisting of a bacterial polypeptide, a viral polypeptide, a fungal polypeptide, a parasite polypeptide, an allergen, a tumor specific polypeptide, and immunogenic fragments, analogs, or derivatives thereof.

78. The composition of claim 74, wherein said immunomodulatory polypeptide is selected from the group consisting of a cytokine, a chemokine, and immunomodulatory fragments, analogs, or derivatives thereof.

79. The composition of claim 74, wherein said functional self polypeptide is selected from the group consisting of insulin, dystrophin, cystic fibrosis transmembrane conductance regulator, granulocyte macrophage colony stimulating factor, granulocyte colony stimulating factor, macrophage colony stimulating factor colony stimulating factor, interleukin 2, interleukin-3, interleukin 4, interleukin 5, interleukin 6, interleukin 7, interleukin 8, interleukin 10, interleukin 12, interleukin 15, interleukin 18, interferon alpha, interferon beta, interferon gamma, interferon omega, interferon tau, interferon gamma inducing factor I, transforming growth factor beta, RANTES, macrophage inflammatory proteins, platelet derived growth factor, tumor necrosis factor, epidermal growth factor, vascular epithelial growth factor, fibroblast growth factor, nerve growth factor, brain derived neurotrophic factor, neurotrophin-2, neurotrophin-3, neurotrophin-4, neurotrophin-5, glial cell line-derived neurotrophic factor, ciliary neurotrophic factor, erythropoietin, and therapeutically active fragments, analogs,and derivatives thereof.

80. The composition of claim 58, further comprising a transfection facilitating agent selected from the group consisting of cationic lipids, calcium phosphate, alum, gold, tungsten, or other metal particles, peptides, proteins, and polymers.

81. The composition of claim 80, wherein said transfection facilitating agent is a cationic lipid.

82. The composition of claim 81, wherein said cationic lipid is selected from the group consisting of DMRIE, GAP-DMORIE and GAP-DLRIE.

83. The composition of claim 81, wherein said cationic lipid further comprises one or more co-lipids.

84. The composition of claim 83, wherein said co-lipids are selected from the group consisting of DOPE, DPyPE, and DMPE.

85. The composition of claim 84, comprising GAP-DLRIE and DOPE.

86. The composition of claim 83, wherein the cationic lipid:co-lipid molar ratio ranges from about 2:1 to 1:2.

87. The composition of claim 86, wherein the cationic lipid:co-lipid molar ratio is about 1:1.

88. A method for delivering a polypeptide to a vertebrate, comprising administering into a tissue or cavity of said vertebrate the composition of claim 58;

wherein said polypeptide is expressed in the vertebrate in an amount sufficient to be detectable.

89. The method of claim 88;

wherein said polypeptide is a therapeutic polypeptide;

wherein said vertebrate is in need of the therapy provided by said polypeptide; and

wherein said therapeutic polypeptide is expressed in the vertebrate in a therapeutically effective amount.

90. The method of claim 88,

wherein said polypeptide is an immunogenic or immunomodulatory polypeptide;

wherein said vertebrate is in need of such an enhanced or modulated immune response provided by said polypeptide; and

wherein said immunogenic or immunomodulatory polypeptide is expressed in the vertebrate in a sufficient amount to induce a desired immune response.

91. The method of claim 88,

wherein said polypeptide is a functional self polypeptide;

wherein said vertebrate is incapable of making a sufficient amount of said polypeptide; and

wherein said functional self polypeptide is expressed in the vertebrate in a sufficient amount to supply the vertebrate's requirements for said polypeptide.

92. The method of claim 88, wherein said vertebrate is a mammal.

93. The method of claim 92, wherein said mammal is a human.

94. The method of claim 88, wherein said tissue is selected from the group consisting of muscle, skin, brain tissue, lung tissue, liver tissue, spleen tissue, bone marrow tissue, thymus tissue, heart tissue, lymph tissue, blood tissue, bone tissue, connective tissue, mucosal tissue, pancreas tissue, kidney tissue, gall bladder tissue, intestinal tissue, testicular tissue, ovarian tissue, uterine tissue, vaginal tissue, rectal tissue, nervous system tissue, eye tissue, glandular tissue, and tongue tissue.

95. The method of claim 88, wherein said cavity is selected from the group consisting of the lungs, the mouth, the nasal cavity, the stomach, the peritoneal cavity, the intestine, a heart chamber, veins, arteries, capillaries, lymphatic cavities, the uterine cavity, the vaginal cavity, the rectal cavity, joint cavities, ventricles in brain, spinal canal in spinal cord, and the ocular cavities.

96. The method of claim 88, wherein said cavity comprises a mucosal surface.

97. The method of claim 96, wherein said mucosal surface is lung tissue.

98. The method of claim 94, wherein said tissue is muscle.

99. The method of claim 98, wherein said tissue is skeletal muscle, smooth muscle, or myocardium.

100. The method of claim 88, wherein said administration is by a route selected from the group consisting of intramuscular, intravenous, intratracheal, intranasal, transdermal, interdermal, subcutaneous, intraocular, vaginal, rectal, intraperitoneal, intraintestinal and inhalation.

101. The method of claim 88, wherein said administration route is intravenous.

102. The method of claim 88, wherein said administration route is intramuscular.

103. The method of claim 102, wherein said administration is by intramuscular injection.

104. The method of claim 88, wherein said administration is mediated by a catheter.

105. A method of reducing the amount of polynucleotide required to obtain a desired clinical response in a vertebrate, comprising administering to the vertebrate the composition of claim 58.

106. A pharmaceutical kit comprising:

(a) a container holding about 1 ng to about 30 mg of a polynucleotide which operably encodes a polypeptide within vertebrate cells *in vivo*; and

(b) an auxiliary agent selected from the group consisting of Nonidet® P40, Triton X-100™, Pluronic® F68, Pluronic® F77, Pluronic® F108, Pluronic® P65, Pluronic® F103, Pluronic® L31, Pluronic® L44, Pluronic® L61, Pluronic® L64, Pluronic® L92, Pluronic® 17R4, Pluronic® 25R4 and Pluronic® 25R2;

whereby said polynucleotide is provided in a prophylactically or therapeutically effective amount to treat a vertebrate.

107. The pharmaceutical kit of claim 106, wherein (b) is in the container of (a).

108. The pharmaceutical kit of claim 106, wherein (b) is in a separate container from (a).

109. The pharmaceutical kit of claim 106, further comprising an administration means.

110. A composition comprising:

(a) about 1 ng to about 30 mg of a polynucleotide in aqueous solution which operably encodes a polypeptide upon delivery to vertebrate cells *in vivo*, wherein said polynucleotide is complexed with a cationic lipid;

(b) a salt M-X dissolved in said aqueous solution at a molar concentration ranging from about 0.1 mM to about 50 mM, and reaction, association, and dissociation products thereof, wherein M is a cation selected from the group consisting of sodium and potassium, wherein X is an anion selected from the group consisting of phosphate, acetate, bicarbonate, sulfate, and pyruvate; and wherein said aqueous solution is substantially free of chloride anion.

111. The composition of claim 110, wherein M-X is present at a molar concentration of about 1 mM to about 20 mM.

112. The composition of claim 111, wherein M-X is present at a molar concentration of about 1 mM to about 5 mM.

113. The composition of claim 112, wherein M-X is present at a molar concentration of about 2.5 mM.

114. The composition of claim 110, wherein M is sodium or potassium, and B is phosphate.

115. The composition of claim 110, wherein said cationic lipid is selected from the group consisting of DMRIE, GAP-DMORIE and GAP-DLRIE.

116. The composition of claim 110, wherein said cationic lipid further comprises one or more co-lipids.

117. The composition of claim 116, wherein said co-lipids are selected from the group consisting of DOPE, DPyPE, and DMPE.

118. The composition of claim 117, comprising GAP-DLRIE and DOPE.

119. The composition of claim 116, wherein the cationic lipid:co-lipid molar ratio ranges from about 2:1 to 1:2.

120. The composition of claim 119, wherein the cationic lipid:co-lipid molar ratio is about 1:1.

121. The composition of claim 110, wherein said polynucleotide is DNA operably associated with a promoter

122. The composition of claim 121, wherein said polynucleotide is contained on a plasmid.

123. The composition of claim 110, wherein said polynucleotide is RNA.

124. The composition of claim 123, wherein said polynucleotide is contained in messenger RNA.

125. The composition of claim 110, wherein said polypeptide is selected from the group consisting of a therapeutic polypeptide, an antigenic polypeptide, an immunogenic polypeptide, an immunomodulatory polypeptide, and a functional self polypeptide.

126. The composition of claim 125, wherein said therapeutic polypeptide is selected from the group consisting of granulocyte macrophage colony stimulating factor, granulocyte colony stimulating factor, macrophage colony stimulating factor colony stimulating factor, interleukin 2, interleukin-3, interleukin 4, interleukin 5, interleukin 6, interleukin 7, interleukin 8, interleukin 10, interleukin 12, interleukin 15, interleukin 18, interferon alpha, interferon beta, interferon gamma, interferon omega, interferon tau, interferon gamma inducing factor I, transforming growth factor beta, RANTES, macrophage inflammatory proteins, Leishmania elongation initiating factor, platelet derived growth factor, tumor necrosis factor, epidermal growth factor, vascular epithelial growth factor, fibroblast growth factor, nerve growth factor, brain derived neurotrophic factor, neurotrophin-2, neurotrophin-3, neurotrophin-4, neurotrophin-5, glial cell line-derived neurotrophic factor, ciliary neurotrophic factor, erythropoietin, insulin, and therapeutically active fragments, derivatives, and analogs thereof.

127. The composition of claim 125, wherein said antigenic polypeptide is selected from the group consisting of a bacterial polypeptide, a viral polypeptide, a fungal polypeptide, a parasite polypeptide, an allergenic polypeptide, a tumor specific polypeptide, and antigenic fragments, analogs, and derivatives thereof.

128. The composition of claim 125, wherein said immunogenic polypeptide is selected from the group consisting of a bacterial polypeptide, a viral polypeptide, a fungal polypeptide, a parasite polypeptide, an allergenic

polypeptide, a tumor specific polypeptide, and immunogenic fragments, analogs, and derivatives thereof.

129. The composition of claim 125, wherein said immunomodulatory polypeptide is selected from the group consisting of a cytokine, a chemokine, and immunomodulatory fragments, analogs, or derivatives thereof.

130. The composition of claim 125, wherein said functional self polypeptide is selected from the group consisting of insulin, dystrophin, cystic fibrosis transmembrane conductance regulator, granulocyte macrophage colony stimulating factor, granulocyte colony stimulating factor, macrophage colony stimulating factor colony stimulating factor, interleukin 2, interleukin-3, interleukin 4, interleukin 5, interleukin 6, interleukin 7, interleukin 8, interleukin 10, interleukin 12, interleukin 15, interleukin 18, interferon alpha, interferon beta, interferon gamma, interferon omega, interferon tau, interferon gamma inducing factor I, transforming growth factor beta, RANTES, macrophage inflammatory proteins, platelet derived growth factor, tumor necrosis factor, epidermal growth factor, vascular epithelial growth factor, fibroblast growth factor, nerve growth factor, brain derived neurotrophic factor, neurotrophin-2, neurotrophin-3, neurotrophin-4, neurotrophin-5, glial cell line-derived neurotrophic factor, ciliary neurotrophic factor, erythropoietin, and therapeutically active fragments, analogs, or derivatives thereof.

131. The composition of claim 111, further comprising a transfection facilitating agent selected from the group consisting of calcium phosphate, alum, gold, tungsten, or other metal particles, peptides, proteins, and polymers.

132. The composition of claim 111, further comprising an auxiliary agent selected from the group consisting of a surfactant, a detergent, a polysaccharide, a chelator, a DNase inhibitor, and a condensing agent.

133. The composition of claim 132, wherein said auxiliary agent selected from the group consisting of Pluronic® F68, Pluronic® F77, Pluronic® F108, Pluronic® F127, Pluronic® P65, Pluronic® P85, Pluronic® F103, Pluronic® P104, Pluronic® P105, Pluronic® P123, Pluronic® L31, Pluronic® L43, Pluronic® L44, Pluronic® L61, Pluronic® L62, Pluronic® L64, Pluronic® L81, Pluronic® L92, Pluronic® L101, Pluronic® L121, Pluronic® R 17R4, Pluronic® R 25R4, Pluronic® R 25R2, IGEPAL CA 630®, NONIDET NP-40, Nonidet ® P40, Tween-20®, Tween-80®, Triton X-100™, Triton X-114™, Thesit®; sodium dodecyl sulfate (SDS); stachyose; dimethylsulfoxide (DMSO); and EDTA.

134. The composition of claim 133, wherein said auxiliary agent is selected from the group consisting of Nonidet® P40, Triton X-100™, Pluronic® F68, Pluronic® F77, Pluronic® F108, Pluronic® P65, Pluronic® F103, Pluronic® L31, Pluronic® L44, Pluronic® L61, Pluronic® L64, Pluronic® L92, Pluronic® R 17R4, Pluronic® R 25R4 and Pluronic® R 25R2.

135. The composition of claim 134, wherein said auxiliary agent is Pluronic® R 25R2.

136. The composition of claim 134, comprising an amount of auxiliary agent selected from the group consisting of about about 0.01% (v/v) to about 0.1% (v/v) of NONIDET NP-40®; about 0.006% (v/v) to about 0.1% (v/v) of Triton X-100™; about 0.1% (w/v) to about 6.0% (w/v) of Pluronic® F68; about 0.001% (w/v) to about 2.0% (w/v) of Pluronic® F77; about 0.01%

(w/v) to about 1.0% (w/v) of Pluronic® F108; about 0.01% (w/v) to about 1% (w/v) Pluronic® P65; about 0.01% (w/v) to about 1.0% (w/v) of Pluronic® F103; about 0.0005% (w/v) to about 1.0% (w/v) of Pluronic® L44; about 0.01% (w/v) to about 1.0% (w/v) of Pluronic® L64; about 0.002% (w/v) to about 1.0% (w/v) of Pluronic® R 17R4; about 0.002% (w/v) to about 1.0% (w/v) of Pluronic® R 25R4; and about 0.001% (w/v) to about 1.0% (w/v) of Pluronic® R 25R2.

137. The composition of claim 136, comprising about 0.001% (w/v) to about 1.0% (w/v) of Pluronic® R 25R2.

138. The composition of claim 136, comprising an amount of auxiliary agent selected from the group consisting of about 0.01% (v/v) to about 0.05% (v/v) of NONIDET N-P 40®; about 0.01% (v/v) to about 0.03% (v/v) of Triton X-100™; about 0.5% to about 4.0% (w/v) of Pluronic® F68; about 0.1% (w/v) to about 1.7% (w/v) of Pluronic® F77; about 0.05% (w/v) to about 0.5% (w/v) of Pluronic® F108, about 0.1% (w/v) to about 1% (w/v) of Pluronic® P65; about 0.05% (w/v) to about 0.10% (w/v) of Pluronic® F103; about 0.001% (w/v) to about 0.1% (w/v) Pluronic® L31; about 0.001% (w/v) to about 0.10% (w/v) of Pluronic® L44; about 0.001% (w/v) to about 0.1% (w/v) Pluronic® L61; about 0.01% (w/v) to about 0.5% (w/v) of Pluronic® L64; about 0.001 % (w/v) to about 1.0% (w/v) Pluronic® L92; about 0.01% (w/v) to about 0.10% (w/v) of Pluronic® R 17R4; about 0.01% (w/v) to about 0.10% (w/v) of Pluronic® R 25R4; and about 0.001% (w/v) to about 0.1% (w/v) of Pluronic® R 25R2.

139. The composition of claim 138, comprising about 0.001% (w/v) to about 0.1% (w/v) of Pluronic® R 25R2.

140. The composition of claim 138, comprising an amount of auxiliary agent selected from the group consisting of 0.01% NONIDET NP-40®; 0.01% (v/v) Triton X-100™; 4% Pluronic® F68; 1.0% (w/v) Pluronic® F77; 0.1% (w/v) of Pluronic® F108; 0.5% (w/v) of Pluronic® P65; 0.05% (w/v) of Pluronic® F103; 0.05% (w/v) of Pluronic® L31; 0.001% (w/v) of Pluronic® L44; 0.01% (w/v) of Pluronic® L61; about 0.01% (w/v) to about 0.1% (w/v) of Pluronic® L64; 0.05% (w/v) of Pluronic® L92; 0.10% (w/v) of Pluronic® R 17R4; 0.01% (w/v) of Pluronic® R 25R4; and 0.01% (w/v) of Pluronic® R 25R2.

141. The composition of claim 140, comprising 0.01% (w/v) of Pluronic® R 25R2.

142. A method for delivering a polypeptide into a vertebrate, comprising administering into a tissue or cavity of said vertebrate the composition of claim 110;

wherein said aqueous solution is substantially free of chloride anion, and wherein said polypeptide is expressed in the vertebrate in an amount sufficient to be detectable.

143. The method of claim 142;

wherein said polypeptide is a therapeutic polypeptide;

wherein said vertebrate is in need of the therapy provided by said polypeptide; and

wherein said therapeutic polypeptide is expressed in the vertebrate in a therapeutically effective amount.

144. The method of claim 142,

wherein said polypeptide is an immunogenic or immunomodulatory polypeptide;

wherein said vertebrate is in need of such an enhanced or modulated immune response provided by said polypeptide; and

wherein said immunogenic or immunomodulatory polypeptide is expressed in the vertebrate in a sufficient amount to induce a desired immune response.

145. The method of claim 142,

wherein said polypeptide is a functional self polypeptide;

wherein said vertebrate is incapable of making a sufficient amount of said polypeptide; and

wherein said functional self polypeptide is expressed in the vertebrate in a sufficient amount to supply the vertebrate's requirements for said polypeptide.

146. The method of claim 142, wherein said vertebrate is a mammal.

147. The method of claim 142, wherein said mammal is a human.

148. The method of claim 142, wherein said tissue is selected from the group consisting of muscle, skin, brain tissue, lung tissue, liver tissue, spleen tissue, bone marrow tissue, thymus tissue, heart tissue, lymph tissue, blood tissue, bone tissue, connective tissue, mucosal tissue, pancreas tissue, kidney tissue, gall bladder tissue, intestinal tissue, testicular tissue, ovarian tissue, uterine tissue, vaginal tissue, rectal tissue, nervous system tissue, eye tissue, glandular tissue, and tongue tissue.

149. The method of claim 142, wherein said cavity is selected from the group consisting of the lungs, the mouth, the nasal cavity, the stomach, the peritoneal cavity, the intestine, a heart chamber, veins, arteries, capillaries, lymphatic cavities, the uterine cavity, the vaginal cavity, the rectal cavity, joint cavities, ventricles in brain, spinal canal in spinal cord, and the ocular cavities.

150. The method of claim 142, wherein said cavity comprises a mucosal surface.

151. The method of claim 149, wherein said mucosal surface is lung tissue.

152. The method of claim 142, wherein said said administration is by a route selected from the group consisting of intravenous, intratracheal, intranasal, transdermal, intramuscular, interdermal, subcutaneous, intraocular, vaginal, rectal and inhalation.

153. The method of claim 142, wherein said administration route is intravenous.

154. The method of claim 153, wherein said administration route is intratracheal.

155. The method of claim 153, wherein said administration route is intranasal.

156. The method of claim 142, wherein said administration is mediated by a catheter.

157. The method of claim 142, wherein said administration is by injection.

158. A method of reducing the amount of polynucleotide required to obtain a desired clinical response in a vertebrate, comprising administering to the vertebrate the composition of claim 110.

159. A pharmaceutical kit comprising:

(a) a container holding about 1 ng to about 30 mg of a polynucleotide which operably encodes a polypeptide within vertebrate cells *in vivo*;

(b) an amount of a salt M-X which, when dissolved in an prescribed volume of distilled water, results in an aqueous solution with a molar concentration of said salt from about 0.1 mM to about 150 mM, and reaction, association, or dissociation products thereof, where M is a cation selected from the group consisting of sodium and potassium, wherein X is an anion selected from the group consisting of phosphate, acetate, bicarbonate, sulfate, and pyruvate, and wherein the aqueous solution formed thereby is essentially free of chloride anion;

(c) a cationic lipid;

whereby said polynucleotide is provided in a prophylactically or therapeutically effective amount to treat a vertebrate.

160. The pharmaceutical kit of claim 159, wherein (b) is in the container as (a).

161. The pharmaceutical kit of claim 159, wherein (c) is in the same container as (a).

162. The pharmaceutical kit of claim 159, wherein (b) and (c) are in the same container as (a).

163. The pharmaceutical kit of claim 159, further comprising an administration means.

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